Commentary

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National Institute for Occupational Safety and Health: Areas of Concern

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The National Institute for Occupational Safety and Health (NIOSH) is evaluating potential human health risks that might result from workplace exposures to phthalate esters, including the following workplace applications of di(2-ethylhexyl) phthalate (DEHP): (1) respirator quantitative fit testing (QNFT); (2) plasticizers; (3) air-filtration system leakage tests.

QNFT is routinely performed to determine respirator facial fit. A polydisperse DEHP aerosol is nebulized in QNFT and incorporated as a test atmosphere to quantify respirator faceseal leakage. However, emerging evidence of phthalate toxicity prompted NIOSH to question the current practice of using a DEHP aerosol in QNFT and whether alternate test agents may be substituted for DEHP in the procedure. NIOSH has tested several alternate agents to evaluate their aerosol-generating properties in existing QNFT equipment made for DEHP. Our results have indicated that at least three substances, including aerosols generated with refined corn oil, di(2-ethylhexyl) sebacate (DEHS), and dimethicone, qualify to replace DEHP. Furthermore, all the data examined have indicated that refined corn oil stands apart from the other proposed agents and currently represents the best option for DEHP replacement.

A review of the toxicities and aerosol properties of both DEHP and candidate substitutes will be described in a forthcoming NIOSH peer reviewed report, projected for publication in 1982. The report will recommend refined corn oil for interim DEHP substitution in the QNFT procedure. In conjunction with this report, NIOSH is conducting acute and subchronic inhalation toxicity testing of refined corn oil and DEHS in rodents at the Johns Hopkins University. Animals will be exposed to aerosols of either substance nebulized by the same equipment used in QNFT. Doses for the subchronic exposure will be determined in the acute phase of the experimental protocol. Testing began in October 1981 and will take 18 months for completion.

Another occupational application of phthalates under evaluation is the extensive use of DEHP as a plasticizer. Our review has concluded that the plastics industry may not be characterized adequately for DEHP exposures, although the exposure potential may be low due to a high degree of mechanization in this industry. NIOSH field investigators are currently reviewing potential areas where DEHP plasticizer exposures might occur. If a suitable cohort is identified, NIOSH will consider a joint epidemiologic study with the U.S. Environmental Protection Agency. Results of our preliminary survey are anticipated by June 1982.

Occupational exposure to thermally generated aerosols has also been considered in the selection of a cohort for the proposed epidemiologic study. NIOSH is presently evaluating worker exposures to a monodisperse, thermally generated DEHP aerosol, widely used in a test procedure to detect leaks in air-filtration systems. However, breakdown products from the thermally treated DEHP could contribute confounding factors to the assessment of human health effects. Accordingly, NIOSH believes that a better candidate for study would be a filter test utilizing DEHP nebulized at room temperature rather than a thermally generated aerosol.

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